FOREST PRODUCTS
Project Fact Sheet

REPLACING CHEMICALS IN RECYCLE MILLS WITH MECHANICAL ALTERNATIVES

BENEFITS

- Energy savings of > 1 billion kWh/yr
- Reduction in operational costs of recycling mills
- Major cost savings for stickies-control chemicals

APPLICATIONS

Both the vendor and two recycling mills will be directly involved in this project. This will ease the transfer of the technology when it is ready for commercialization.

Mechanical Shock Waves Will Be Substituted for Chemicals in Pulp and Paper Recycling Operations

Stickies cause considerable downtime in mills utilizing secondary fiber, and several million dollars' worth of minerals and polymers are added for handling and detackifying stickies during processing.

A promising method for achieving the same result through mechanical means is the use of pulsed power technology to deliver a shock wave to the pulp slurry. Energetic chemical species such as the hydroxyl radical are generated by the shock wave and used to oxidize stickies.

Figure 1. The photograph shows the effect of the shock wave on air bubbles in water.

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PROJECT DESCRIPTION

Goal: To study the feasibility and economics of applying pulsed power technology to the pulp and paper industry through two initial applications.

When a spark is discharged under water, it creates a plasma, which sets up a shock wave that also generates reactive hydroxyl radicals by splitting water. The shock wave can potentially be used to disperse stickies, and the radicals are able to oxidize stickies to the extent that they lose their tack and become benign.

The two objectives to this research in the forest products industry are as follows:

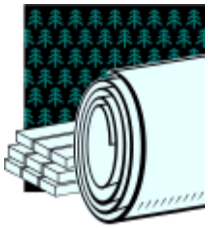
(1) Dispersion of stickies in whitewater systems. Researchers will induce agglomeration of stickies and measure its rate, using two model stickies: a hot melt (polyvinyl acetate) and a pressure-sensitive adhesive (acrylate). The pulser should prevent agglomeration and break up agglomerated stickies, unlike chemicals, which only accomplish one or the other operation.

(2) Detackification of stickies. Studies will examine the potential detackification of stickies through energetic chemical species created by the shock wave. Shock waves will be applied, and the detackification of stickies examined as a function of pulse energy and other parameters. Stickie suspensions in water and in pulp slurries will also be examined to determine the pulse level required for optimum detackification.

The laboratory-scale work of this two-year project will be conducted at the Institute of Paper Science and Technology, while the field work will be carried out at commercial mills.

PROGRESS & MILESTONES

- Year one will focus on fundamental studies on the mechanism of the process.
- Applications and mill trials will be addressed in the second year, and an economic analysis of the system will be conducted.



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